MATHEMATICS CROSSWALK
2008 MATHEMATICS STANDARD TO 2003 MATHEMATICS STANDARD
GRADE 6

MATHEMATICS STANDARD ARTICULATED BY GRADE LEVEL				
Strand 1: Number and Operations				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
1. Number Sense	1	Convert between expressions for positive rational numbers, including fractions, decimals, percents, and ratios.	4	Determine the equivalency between and among fractions, decimals, and percents in contextual situations.
	2	Use prime factorization to • express a whole number as a product of its prime factors and • determine the greatest common factor and least common multiple of two whole numbers.	5	Identify the greatest common factor for two whole numbers.
			6	Determine the least common multiple for two whole numbers.
			7	Express a whole number as a product of its prime factors, using exponents when appropriate.
	3	Demonstrate an understanding of fractions as rates, division of whole numbers, parts of a whole, parts of a set, and locations on a real number line.	1	Express fractions as ratios, comparing two whole numbers (e.g., ¾ is equivalent to 3:4 and 3 to 4).
	4	Compare and order integers; and positive fractions, decimals, and percents.	2	Compare two proper fractions, improper fractions, or mixed numbers.
			3	Order three or more proper fractions, improper fractions, or mixed numbers.
			M07-S1C1-04	Choose the appropriate signed real number to represent a contextual situation.
	5	*Express that a number's distance from zero on the number line is its absolute value.*		
	6	*Express the inverse relationships between exponents and roots for perfect squares and cubes.*		

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2. Numerical Operations	1	*Apply and interpret the concepts of addition and subtraction with integers using models.*		
	2	Multiply multi-digit decimals through thousandths.	14	Solve problems involving fractions or decimals (including money) in contextual situations.
			15	Simplify numerical expressions using the order of operations with grade-appropriate operations on number sets.
	3	Divide multi-digit whole numbers and decimals by decimal divisors with and without remainders.	15	Simplify numerical expressions using the order of operations with grade-appropriate operations on number sets.
	4	Multiply and divide fractions.	6	Simplify fractions to lowest terms.
			8	Demonstrate the process of multiplication of proper fractions using models.
			9	Multiply proper fractions.
			10	Multiply mixed numbers.
			12	Divide proper fractions.
			13	Divide mixed numbers.
			14	Solve problems involving fractions or decimals (including money) in contextual situations.
	5	Provide a mathematical argument to explain operations with two or more fractions or decimals.	3	Apply grade-level appropriate properties to assist in computation.
			11	Demonstrate that division is the inverse of multiplication of proper fractions.
	6	Apply the commutative, associative, distributive, and identity properties to evaluate numerical expressions involving whole numbers.	3	Apply grade-level appropriate properties to assist in computation.
			15	Simplify numerical expressions using the order of operations with grade-appropriate operations on number sets.

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Strand 1: Number and Operations				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
2. Numerical Operations	7	Simplify numerical expressions (involving fractions, decimals, and exponents) using the order of operations with or without grouping symbols.	6	Simplify fractions to lowest terms.
			7	Add or subtract proper fractions and mixed numbers with unlike denominators with regrouping.
			8	Demonstrate the process of multiplication of proper fractions using models.
			9	Multiply proper fractions.
			10	Multiply mixed numbers.
			12	Divide proper fractions.
			13	Divide mixed numbers.
			14	Solve problems involving fractions or decimals (including money) in contextual situations.
			15	Simplify numerical expressions using the order of operations with grade-appropriate operations on number sets.
	M06-S5C2-03	**Moved to Strand 5 Concept 2**	1	Select the grade-level appropriate operation to solve word problems.
	M06-S5C2-03	**Moved to Strand 5 Concept 2**	2	Solve word problems using grade-level appropriate operations and numbers.
		REMOVED	4	Apply the symbols for "…" or "‾‾" to represent repeating decimals and ":" to represent ratios, superscripts as exponents.
		REMOVED (This skill is required throughout the standard.)	5	Use grade-level appropriate mathematical terminology.

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Strand 1: Number and Operations				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
3. Estimation	1	*Use benchmarks as meaningful points of comparison for rational numbers.*		
	2	Make estimates appropriate to a given situation and verify the reasonableness of the results.	1	Solve grade-level appropriate problems using estimation.
			2	Use estimation to verify the reasonableness of a calculation (e.g., Is 5/9 x 3/7 more than 1?).
			3	Round to estimate quantities in contextual situations (e.g., round up or round down).
			4	Estimate and measure for the area and perimeter of polygons using a grid.
			5	Verify the reasonableness of estimates made from calculator results within a contextual situation.

Strand 2: Data Analysis, Probability, and Discrete Mathematics				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
1. Data Analysis (Statistics)	1	Solve problems by selecting, constructing, and interpreting displays of data, including histograms and stem-and-leaf plots.	2	Construct a histogram, line graph, scatter plot, or stem-and-leaf plot with appropriate labels and title from organized data.
			8	Solve contextual problems using bar graphs, tally charts, and frequency tables.
	2	Formulate and answer questions by interpreting, analyzing, and drawing inferences from displays of data, including histograms and stem-and-leaf plots.	3	Interpret simple displays of data including double bar graphs, tally charts, frequency tables, circle graphs, and line graphs.
			4	Answer questions based on simple displays of data including double bar graphs, tally charts, frequency tables, circle graphs, and line graphs.
	3	Use extreme values, mean, median, mode, and range to analyze and describe the distribution of a given data set.	5	Find the mean, median (odd number of data points), mode, range, and extreme values of a given numerical data set.

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Strand 2: Data Analysis, Probability, and Discrete Mathematics				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
1. Data Analysis (Statistics)	4	Compare two or more sets of data by identifying trends.	6	Identify a trend (variable increasing, decreasing, remaining constant) from displayed data.
			7	Compare trends in data related to the same investigation.
		REMOVED	1	Formulate questions to collect data in contextual situations.
2. Probability	1	Use data collected from multiple trials of a single event to form a conjecture about the theoretical probability.	6	Make predictions from the results of student-generated experiments using objects (e.g., coins, spinners, number cubes, cards).
	2	Use theoretical probability to • predict experimental outcomes, • compare the outcome of the experiment to the prediction, and • replicate the experiment and compare results.	1	Name the possible outcomes for a probability experiment.
			3	Predict the outcome of a grade-level appropriate probability experiment.
			4	Record the data from performing a grade-level appropriate probability experiment.
			5	Compare the outcome of an experiment to predictions made prior to performing the experiment.
	3	Determine all possible outcomes (sample space) of a given situation using a systematic approach.	3	Predict the outcome of a grade-level appropriate probability experiment.
	M05-S2C2-01	**Moved to Grade 5**	2	Express probabilities of a single event as a decimal.
3. Systematic Listing and Counting	1	Build and explore tree diagrams where items repeat.	1	Determine all possible outcomes involving a combination of three sets of three items, using a systematic approach (e.g., 3 different shirts, 3 different pairs of pants, and 3 different belts).
			2	Determine all possible arrangements given a set with four or fewer objects using a systematic list, table or tree diagram when order is not important.

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Strand 2: Data Analysis, Probability, and Discrete Mathematics				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
3. Systematic Listing and Counting	2	*Explore counting problems with Venn diagrams using three attributes.*		
4. Vertex-Edge Graphs	1	Investigate properties of vertex-edge graphs • Hamilton paths, • Hamilton circuits, and • shortest route.	1	Find the shortest route on a map from one site to another (vertex-edge graph).
			M07-S2C4-01	Find the shortest circuit on a map that makes a tour of specified sites (vertex-edge graph).
	2	*Solve problems related to Hamilton paths and circuits.*		

Strand 3: Patterns, Algebra, and Functions				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
1. Patterns	1	Recognize, describe, create, and analyze a numerical sequence involving fractions and decimals using all four basic operations.	1	Communicate a grade-level appropriate recursive pattern, using symbols or numbers.
			2	Extend a grade-level appropriate iterative pattern.
			3	Solve grade-level appropriate iterative pattern problems.
2. Functions and Relationships	1	Recognize and describe a relationship between two quantities, given by a chart, table, or graph, using words and expressions.	1	Describe the rule used in a simple grade-level appropriate function (e.g., T-chart, input/output model).
3. Algebraic Representations	1	Use an algebraic expression to represent a quantity in a given context.	2	Use variables in contextual situations.
	2	*Create and solve two-step equations that can be solved using inverse properties with fractions and decimals.*		
	3	Translate both ways between a verbal description and an algebraic expression or equation.	3	Translate a written phrase to an algebraic expression (e.g., The quotient of *m* and 5 is $\frac{m}{5}$ *or* $m \div 5$).

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Strand 3: Patterns, Algebra, and Functions				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
			4	Translate a phrase written in context into an algebraic expression (e.g., Write an expression to describe the situation: John has *x* pieces of candy and buys three more. *x* + 3).
3. Algebraic Representations	4	Evaluate an expression involving the four basic operations by substituting given fractions and decimals for the variable.	1	Evaluate expressions involving the four basic operations by substituting given fractions for the variable (e.g., *n*+3, when *n*= ½).
			M05-S3C3-01	Evaluate expressions involving the four basic operations by substituting given decimals for the variable.
	M04-S3C3-02	**Moved to Grade 4**	5	Solve one-step equations with one variable represented by a letter or symbol, using inverse operations with whole numbers.
4. Analysis of Change	1	Determine a pattern to predict missing values on a line graph or scatterplot.	1	Identify values on a given line graph or scatter plot (e.g., Given a line showing wages earned per hour, what is the wage at five hours?).

Strand 4: Geometry and Measurement				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
1. Geometric Properties	1	Define π (pi) as the ratio between the circumference and diameter of a circle and explain the relationship among the diameter, radius, and circumference.	8	Identify the diameter, radius, and circumference of a circle or sphere.
			M05-S4C1-09	Identify the diameter, radius, and circumference of a circle.
	2	Solve problems using properties of supplementary, complementary, and vertical angles.	7	Identify supplementary or complementary angles.
			M05-S4C1-06	Recognize that all pairs of vertical angles are congruent.
	M05-S4C1-01	**Moved to Grade 5**	1	Classify polygons by their attributes (e.g., number of sides, length of sides, angles, parallelism, perpendicularity).

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Strand 4: Geometry and Measurement				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
	M05-S4C1-01	**Moved to Grade 5**	2	Draw a geometric figure showing specified properties, such as parallelism and perpendicularity.
1. Geometric Properties	M07-S4C1-03	**Moved to Grade 7**	3	Classify prisms, pyramids, cones, and cylinders by base shape and lateral surface shape.
	M07-S4C1-03	**Moved to Grade 7**	4	Classify 3-dimensional figures by their attributes.
	M05-S4C1-04	**Moved to Grade 5**	5	Compare attributes of 2-dimensional figures with 3-dimensional figures.
	M05-S4C1-01	**Moved to Grade 5**	6	Draw triangles with appropriate labels.
		REMOVED	9	Draw a 2-dimensional shape with a given number of lines of symmetry.
2. Transformation of Shapes	1	Identify a simple translation or reflection and model its effect on a 2-dimensional figure on a coordinate plane using all four quadrants.	1	Identify reflections and translations using pictures.
			M08-S4C2-01	Identify the planar geometric figure that is the result of a given rigid transformation.
	2	*Draw a reflection of a polygon in the coordinate plane using a horizontal or vertical line of reflection.*		
		REMOVED	2	Perform elementary transformations to create a tessellation.
3. Coordinate Geometry	1	Graph ordered pairs in any quadrant of the coordinate plane.	1	Graph a polygon in the first quadrant using ordered pairs.
			M07-S4C3-01	Graph data points in (x, y) form in any quadrant of a coordinate grid.
	2	State the missing coordinate of a given figure on the coordinate plane using geometric properties to justify the solution.	2	State the missing coordinate of a given figure in the first quadrant of a coordinate grid using geometric properties (e.g., Find the coordinates of the missing vertex of a rectangle when two adjacent sides are drawn.).

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Strand 4: Geometry and Measurement				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
			M07-S4C3-02	State the missing coordinate of a given figure in any quadrant of a coordinate grid using geometric properties (e.g., Find the coordinates of the missing vertex of a rectangle when two adjacent sides are drawn.).
4. Measurement	1	Determine the appropriate unit of measure for a given context and the appropriate tool to measure to the needed precision (including length, capacity, angles, time, and mass).	1	Determine the appropriate measure of accuracy within a system for a given contextual situation (e.g., Would you measure the length of your bedroom wall using inches or feet?).
			2	Determine the appropriate tool needed to measure to the needed accuracy.
	2	Solve problems involving conversion within the U.S. Customary and within the metric system.	5	Convert within a single measurement system (U.S. customary or metric) (e.g., How many ounces are equivalent to 2 pounds?).
	3	*Estimate the measure of objects using a scale drawing or map.*		
	4	Solve problems involving the area of simple polygons using formulas for rectangles and triangles.	7	Determine the area of triangles.
	5	Solve problems involving area and perimeter of regular and irregular polygons.	6	Solve problems involving the perimeter of polygons.
			8	Distinguish between perimeter and area in contextual situation.
			9	Solve problems for the areas of parallelograms (includes rectangles).
			M08-S4C4-01	Solve problems for the area of a trapezoid.
	6	*Describe the relationship between the volume of a figure and the area of its base.*		

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Strand 4: Geometry and Measurement				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
4. Measurement	M07-S4C4-07	**Moved to Grade 7**	3	Determine a linear measurement to the appropriate degree of accuracy.
	M05-S4C4-03	**Moved to Grade 5**	4	Measure angles using a protractor.
	M07-S4C4-02	**Moved to Grade 7**	10	Identify parallelograms having the same perimeter or area.
	M07-S4C4-04	**Moved to Grade 7**	11	Determine the actual measure of objects using a scale drawing or map.

Strand 5: Structure and Logic				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
1. Algorithms and Algorithmic Thinking	1	Analyze algorithms for multiplying and dividing fractions and decimals using the associative, commutative, and distributive properties	2	Analyze algorithms for computing with decimals.
			M07-S5C1-02	Analyze algorithms for computing with fractions.
			M08-S5C1-02	Analyze algorithms.
	2	*Create and justify an algorithm to determine the area of a given compound figure using parallelograms and triangles.*		
2. Logic, Reasoning, Problem Solving, and Proof	1	*Analyze a problem situation to determine the question(s) to be answered.*		

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Strand 5: Structure and Logic				
CONCEPT	**2008 PO**	**ITEM DESCRIPTION**	**2003 PO**	**ITEM DESCRIPTION**
2. Logic, Reasoning, Problem Solving, and Proof	2	Identify relevant, missing, and extraneous information related to the solution to a problem.	M06-S5C1-01	Discriminate necessary information from unnecessary information in a given grade-level appropriate word problem.
	3	Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.	M06-S1C2-01	Select the grade-level appropriate operation to solve word problems.
			M06-S1C2-02	Solve word problems using grade-level appropriate operations and numbers.
	4	*Apply a previously used problem-solving strategy in a new context.*		
	5	*Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.*		
	6	*Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.*		
	7	*Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.*		
	8	*Make and test conjectures based on information collected from explorations and experiments.*		
	9	Solve simple logic problems, including conditional statements, and justify solution methods and reasoning.	1	Solve a simple logic problem from given information (e.g., Which of three different people live in which of three different colored houses?).

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